alloy) is used so that the clip can be brazed to the sleeve without disturbing the existing braze from the sleeve to the strands. As one example, an AWS BAG 7 designation alloy may be used to connect the sleeve to the clip. This brazing alloy has a melting temperature of approximately 800 degrees Fahrenheit, while the brazing alloy used to connect the sleeve to the strands was, for example, an AWS B-CUP 5 brazing alloy with a melting temperature of approximately 1400 degrees Fahrenheit.

Continuing with the process, prior to brazing, the sleeve is placed over the clip. Since the sleeve and clip were machined to have a precise fit, the addition of brazing alloy around the sleeve and within the clip may make matable engagement thereof difficult. To facilitate an easy fit, the clip may be slightly heated (approximately 200 degrees Fahrenheit) so that it expands. Thereafter, the clip is placed over the sleeve and is allowed to cool such that it contracts and fits tightly over the sleeve (FIG. 9B—**129**). This heating/expansion process may not be necessary for the tapered sleeve **151** of, for example, FIG. **10** because of the tapered nature of the clip/sleeve connection.

The induction brazing station is fitted with coils that conformally surround the clip, and the station is checked for cooling water leaks. The chill blocks are set in place on the stator bar and are also tested for cooling water leaks. After all checks have been completed, the chill blocks and the induction brazing station are activated (**131**), and the heat is raised to the melting point of the BAG 7 brazing alloy (approximately 900–1100 degrees Fahrenheit). During brazing, additional BAG 7 brazing alloy may be added to the back side of the clip where it meets the sleeve as necessary. When brazing the tapered sleeve, pressure may be continuously applied to the clip thus forcing the clip and sleeve tightly together forming a strong and fluid tight brazed connection. After the brazed connection is complete, the induction heater is removed, and a rag soaked with water/alcohol solution is again used, this time to cover the clip.

The assembly may then be tested for leakage by attaching an air hose (**133**) to the fluid port of the clip and applying pressure while monitoring for leaks (**135**). If leaks exist, the brazing station is reattached and the brazing process repeated. Once a fluid tight assembly is formed, the copper leaves (and/or copper piping) are attached to the new clip (**137**) along with the water hose by a torch brazing procedure such that both the separate electrical and the separate fluidic connections to the connector are established. As final steps, the tape based insulation is reapplied to the end of the stator bar and the new two-piece connector. The bulk insulation is then replaced along with any other generator parts removed during the repair process. With this, the replacement of the defective connector is completed.

As a note, if multiple defective connectors are being replaced at the same time, then the final leak test may be performed on all of the new connectors at once. This could save considerable time depending on how many defective connectors are being replaced with the two-piece connector of the present invention.

If any of the new two-piece connectors fail, then replacement thereof is facilitated by a method opposite to that of the installation procedure described above. To summarize, first the copper leaves (and/or copper piping) and water hose are disconnected from the connector. Assuming a complete replacement is needed, the clip portion of the connector is then heated to the melting point of the clip to sleeve brazing alloy and the clip is removed. The sleeve is then heated (with pins inserted) and it is removed from the strands. The assembly process then moves forward as described hereinabove such that replacement is achieved. Of course, if a leak can be cured at any intermediate stage of disassembly by simply rebrazing, then further disassembly is not required.

As a further note, the two-piece connector of the present invention may be used in the initial fabrication of generators. Due to the higher quality brazed connections between the stator bar and the new two-piece connector, as well as the high quality connections between the clip and sleeve of the connector itself, the connector of the present invention will initially form a more fluid-tight connection such that less frequent repair should be necessary. However, if repair does become necessary, such repair is readily performed as disclosed hereinabove.

To briefly summarize, the techniques of the present invention have numerous advantages and features attributable thereto. Specifically, the techniques disclosed herein facilitate the replacement of a defective electrical and fluidic connector attached to a stator bar while the stator bar is still within the electric generator. This advancement results in a cost savings as a conventional connector repair process requires the stator bars to be physically removed from the generator. This type of repair process is expensive compared to an "in machine" repair. In fact, some electric generator manufacturers recommend a full rebuild of a generator when connectors require replacing. Such a replacement has an excessively high cost associated with it. As a further advantage, the connector of the present invention provides a more fluid tight connection. Moreover, repair of the connector is easily facilitated using the techniques disclosed herein. Thus, the techniques of the present invention improve the reliability of, and repair process associated with, the electrical and fluidic connectors that terminate water cooled stator bars in large electric machines.

While the invention has been described in detail herein, in accordance with certain preferred embodiments thereof, many modifications and changes therein may be affected by those skilled in the art. Accordingly, it is intended by the appended claims to cover all such modifications and changes as fall within the true spirit and scope of the invention.

What is claimed is:

1. A method for providing an electrical and fluidic connector on an electro-fluidic conductor, said electrical and fluidic connector having a first member and a second member that are separate and both electrically conductive, said second member having a fluid port that facilitates fluidic connection to a fluid conductor and said second member being configured to facilitate electrical connection to an electrical conductor, said method comprising the steps of:

(a) securing said first member to said electro-fluidic conductor such that said first member encircles an end portion of said electro-fluidic conductor and forms a fluid tight seal thereto, and electrically connects therewith; and

(b) matably connecting said first member to said second member such that said first member and said second member define a hollow inner chamber that comprises a fluid tight chamber for passing fluid between said electro-fluidic conductor and said fluid port of said second member, and wherein said first member and said second member themselves define an electrical connection between said electro-fluidic conductor and said electrical conductor when said electrical conductor is attached to said second member.

2. The method of claim 1, wherein said method further comprises the step of removing a defective electrical and

fluidic connector from said electro-fluidic conductor prior to said securing step (a).

3. The method of claim 2, wherein said defective electrical and fluidic connector comprises a single piece electrical and fluidic connector such that said method includes removing said single piece electrical and fluidic connector from said electro-fluidic conductor prior to said securing step (a).

4. The method of claim 2, wherein said removing said defective electrical and fluidic connector comprises the step of heating said defective electrical and fluidic connector to soften an existing brazing alloy securing said defective electrical and fluidic connector to said electro-fluidic conductor such that said removing step is facilitated.

5. The method of claim 1, wherein said method further comprises the step of verifying said fluid tight seal of said securing step (a) prior to said matably connecting step (b).

6. The method of claim 5, wherein said verifying step includes affixing a test cap to said first member and pressurizing said electro-fluidic conductor such that any leaks between said first member and said electro-fluidic conductor are detected.

7. The method of claim 1, wherein said securing step (a) comprises the step of brazing said first member to said electro-fluidic conductor using a first brazing alloy.

8. The method of claim 7, wherein prior to said brazing step, said securing step (a) includes placing said first brazing alloy around said end portion of said electro-fluidic conductor.

9. The method of claim 7, wherein said matably connecting step (b) comprises brazing said first member to said second member using a second brazing alloy having a lower melting temperature than a melting temperature of said first brazing alloy.

10. The method of claim 9, wherein said connecting step (b) comprises heating said first member and said second member to a temperature at least as high as the melting temperature of the second brazing alloy but lower than the melting temperature of the first brazing alloy such that the first brazing alloy does not melt during said connecting step (b).

11. The method of claim 1, wherein said first member has at least one groove on an outer surface thereof, and wherein said method further comprises inserting a third brazing alloy into said at least one groove such that said matably connecting step (b) comprises brazing said first member to said second member using said third brazing alloy.

12. The method of claim 11, wherein said matably connecting step (b) comprises inserting said first member flush into said second member prior to said brazing of said first member to said second member.

13. The method of claim 12, wherein said method includes placing a ribbon alloy on an outer surface of said first member after said inserting of said third brazing alloy into said at least one groove and prior to said inserting said first member into said second member, said ribbon alloy securing said first member to said second member as a result of said brazing of said first member to said second member.

14. The method of claim 1, wherein said matably connecting step (b) comprises inserting said first member into said second member and brazing said first member to said second member.

15. The method of claim 14, wherein said method includes placing a ribbon alloy on an outer surface of said first member prior to said inserting said first member into said second member.

16. The method of claim 14, wherein said method further comprises applying pressure that forces said first member into said second member during said brazing of said first member to said second member.

17. The method of claim 1, wherein said method further comprises the step of connecting said electrical conductor and said fluidic conductor to said electrical and fluidic connector for facilitating electrical and fluidic connection thereto.

18. The method of claim 17, wherein said step of connecting said electrical conductor and said fluidic conductor to said electrical and fluidic connector comprises brazing said electrical conductor and said fluidic conductor to said electrical and fluidic connector.

19. The method of claim 18, wherein said fluidic conductor and said electrical conductor comprise a single conductive pipe such that said step of connecting said electrical conductor and said fluidic conductor to said electrical and fluidic connector comprises brazing said single conductive pipe to said electrical and fluidic connector.

20. The method of claim 17, wherein said method further comprises the step of insulating the electrical and fluidic connector.

21. The method of claim 1, wherein said electro-fluidic conductor comprises a stator bar in a water cooled electric machine, and wherein said securing step (a) and said matably connecting step (b) are performed while said stator bar is installed in said water cooled electric machine.

* * * * *

22. A method for providing an electrical and fluidic connector on an electro-fluidic conductor, said electrical and fluidic connector having a sleeve of a predetermined length with an outer surface and a clip having a hollow inner chamber therein with an interior surface, said sleeve and clip being separate and both electrically conductive, said clip having a fluid port communicating with its chamber for facilitating fluidic connection to a fluid conductor and said clip being configured to facilitate electrical connection to an electrical conductor, said method comprising the steps of:

(a) securing said sleeve to said electro-fluidic conductor such that said sleeve encircles an end portion of said electro-fluidic conductor without substantially overhanging said end and forms a fluid tight seal thereto, and electrically connects therewith;

(b) matably fitting and brazing the clip over the sleeve so that substantially the entire length of the sleeve is disposed in the clip with substantially its entire outer surface forming a fluid tight seal with the interior surface of the clip chamber for passing fluid between said electro-fluidic conductor and said fluid port of said clip, and wherein said sleeve and said clip themselves define an electrical connection between said electro-fluidic conductor and said electrical conductor when said electrical conductor is attached to said clip.

23. A method for providing an electrical and fluidic connector on an electro-fluidic conductor, said electrical and fluidic connector having a sleeve of a predetermined length with an outer surface and a clip having a hollow inner chamber therein with an interior surface, said sleeve and clip being separate and both electrically conductive, said clip having a fluid port communicating with its chamber for facilitating fluidic connection to a fluid conductor and said clip being configured to facilitate electrical connection to an electrical conductor, said method comprising the steps of:

(a) removing a defective electrical and fluidic connector from said electro-fluidic conductor by heating said defective connector to soften an existing brazing alloy while chilling the electro-fluidic conductor near the defective connector to remove excess heat from the conductor;

(b) securing said sleeve to said electro-fluidic conductor such that said sleeve encircles an end portion of said electro-fluidic conductor without substantially overhanging said end and forms a fluid tight seal thereto, and electrically connects therewith;

(c) matably fitting and brazing the clip over the sleeve so that substantially the entire length of the sleeve is disposed in the clip with substantially its entire outer surface forming a fluid tight seal with the interior surface of the clip chamber for passing fluid between said electro-fluidic conductor and said fluid port of said clip, and wherein said sleeve and said clip themselves define an electrical connection between said electro-fluidic conductor and said electrical conductor when said electrical conductor is attached to said clip.

24. A method for providing an electrical and fluidic connector on an electro-fluidic conductor, said electrical and fluidic connector having a sleeve of a predetermined length with an outer surface and a clip having a hollow inner chamber therein with an interior surface, wherein the outer surface of the sleeve and the inner surface of the clip chamber are correspondingly tapered, said sleeve and clip being separate and both electrically conductive, said clip having a fluid port communicating with its chamber for facilitating fluidic connection to a fluid conductor and said clip being configured to facilitate electrical connection to an electrical conductor, said method comprising the steps of:

(a) securing said sleeve to said electro-fluidic conductor such that said sleeve encircles an end portion of said electro-fluidic conductor and forms a fluid tight seal thereto, and electrically connects therewith;

(b) matably fitting and brazing the clip over the sleeve forming a fluid tight seal with the interior surface of the clip chamber for passing fluid between said electro-fluidic conductor and said fluid port of said clip, and wherein said sleeve and said clip themselves define an electrical connection between said electro-fluidic conductor and said electrical conductor when said electrical conductor is attached to said clip, wherein pressure is applied during the brazing step so as to force the sleeve into the clip.

25. The method of claim 24, wherein the sleeve encircles said end portion of said electro-fluidic conductor without substantially overhanging said end.

26. The method of claim 24, wherein the clip is matably fit over the sleeve so that substantially the entire length of the sleeve is disposed in the clip with substantially its entire outer surface.

27. A method for providing an electrical and fluidic connector on an electro-fluidic conductor, said electrical

and fluidic connector having a sleeve of a predetermined length with an outer surface and a clip having a hollow inner chamber therein with an interior surface, wherein the outer surface of the sleeve and the inner surface of the clip chamber are correspondingly tapered, said sleeve and clip being separate and both electrically conductive, said clip having a fluid port communicating with its chamber for facilitating fluidic connection to a fluid conductor and said clip being configured to facilitate electrical connection to an electrical conductor, said method comprising the steps of:

(a) removing a defective electrical and fluidic connector from said electro-fluidic conductor by heating said defective connector to soften an existing brazing alloy while chilling the electro-fluidic conductor near the defective connector to remove excess heat from the conductor;

(b) securing said sleeve to said electro-fluidic conductor such that said sleeve encircles an end portion of said electro-fluidic conductor without substantially overhanging said end and forms a fluid tight seal thereto, and electrically connects therewith;

(c) matably fitting and brazing the clip over the sleeve so that substantially the entire length of the sleeve is disposed in the clip with substantially its entire outer surface forming a fluid tight seal with the interior surface of the clip chamber for passing fluid between said electro-fluidic conductor and said fluid port of said clip, and wherein said sleeve and said clip themselves define an electrical connection between said electro-fluidic conductor and said electrical conductor when said electrical conductor is attached to said clip, wherein pressure is applied during the brazing step so as to force the sleeve into the clip.

28. A method for providing an electrical and fluidic connector on an electro-fluidic conductor, said electrical and fluidic connector having a sleeve of a predetermined length with an outer surface and a clip having a hollow inner chamber therein with an interior surface, said sleeve and clip being separate and both electrically conductive, said clip having a fluid port communicating with its chamber for facilitating fluidic connection to a fluid conductor and said clip being configured to facilitate electrical connection to an electrical conductor, said method comprising the steps of:

(a) removing a defective electrical and fluidic connector from said electro-fluidic conductor by heating said defective connector to soften an existing brazing alloy while chilling the electro-fluidic

conductor near the defective connector to remove excess heat from the conductor;

(b) securing said sleeve to said electro-fluidic conductor such that said sleeve encircles an end portion of said electro-fluidic conductor and forms a fluid tight seal thereto, and electrically connects therewith;

(c) matably fitting and brazing the clip over the sleeve forming a fluid tight seal with the interior surface of the clip chamber for passing fluid between said electro-fluidic conductor and said fluid port of said clip, and wherein said sleeve and said clip themselves define an electrical connection between said electro-fluidic conductor and said electrical conductor when said electrical conductor is attached to said clip.